

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-185258

(43)Date of publication of application : 16.07.1996

(51)Int.Cl.

G06F 3/033  
G06F 3/033

(21)Application number : 06-337043

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(22)Date of filing : 27.12.1994

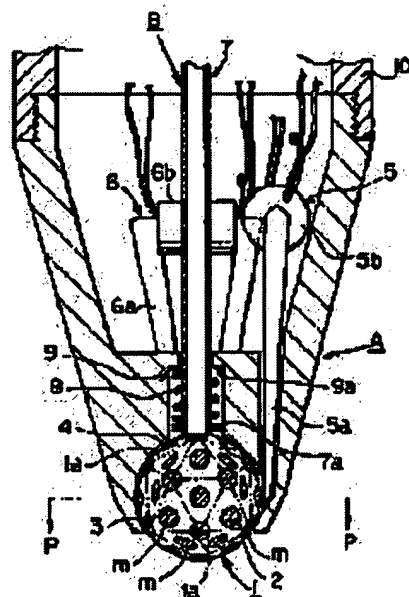
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(54) SPHERICAL MEASUREMENT SENSOR FOR BALL-POINT PEN OR MOUSE FOR COMPUTER OPERATION, AND BALL-POINT PEN FOR COMPUTER OPERATION

(57)Abstract:

PURPOSE: To convert a character, a numeral, and a graphic which are being inputted into a digital signal and input it directly to a computer or to make computer operation easy and accurate.

CONSTITUTION: A small sphere 1 has nonmagnetic bodies 2 and extremely small magnetic bodies 3 mixed nearby the surface of the sphere while having many extremely small magnetic bodies 3 on the top surface at nearly equal intervals to make electromagnetic discrimination possible. The small sphere 1 is inserted loosely in a holder A so that the small sphere can roll in all directions. Further, a 1st magnetic force converting means 5 and a 2nd magnetic force converting means 6 which measure the X-axial rolling direction and Y- axial rolling direction of the nonmagnetic bodies 2 and extremely small bodies 3 electromagnetically and converts the measurement results into electric signals are incorporated.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of

rejection]

[Kind of final disposal of application other than  
the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
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[Date of requesting appeal against examiner's  
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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention digital-signal-izes the alphanumeric graphic form under note, and directly, input actuation is carried out or it relates to a computer on the ball-point for computer operation at the globular form measurement sensor list for the ball-points for computer operation or mice for making computer operation simply and exact.

[0002]

[Description of the Prior Art] Conventionally, a ball-point is the instrument notes of is taken chiefly, and was not able to input a signal to a computer in itself. The digitizer inputted on the other hand while writing down an alphanumeric graphic form on a computer had a limit in the heavy number of sheets of paper etc. That is, it was what detects the pressure of the paper bottom by the writing pressure. Moreover, although there was also a globular form sensor of the mouse for computer operation developed by the applicant concerned, in order to measure this optically, when ink was used, the globular form sensor did not carry out the target rolling motion, or had the problem from which optical measurement is prevented.

[0003]

[Problem(s) to be Solved by the Invention] Then, writing with a ball-point, by making into a technical problem what is inputted to a computer, it is a small sensor, and although not restricted to the heavy number of sheets of paper etc., development is requested as ink coming out. Furthermore, development of the globular form sensor of the simple mouse for computer operation is also demanded.

[0004]

[The means which invention tends to solve] Then, the result of having repeated research wholeheartedly an artificer solving said technical problem, The invention is made for non-magnetic material and a magnetic polar granule to be intermingled near the front face of a corpuscle or this corpuscle. It considers as the microsphere whose electromagnetic discernment made between the magnetic polar granules of a majority of the front face abbreviation regular intervals, and was enabled. A 1st magnetism conversion means to insert this microsphere possible [ rolling in all directions ] in a holder, and to measure the X-axis rolling direction and the Y-axis rolling direction for said non-magnetic material and magnetic polar granule electromagnetic, respectively, By having considered as the ball-point for computer operation or the globular form measurement sensor for mice which comes to build the 2nd magnetism conversion means The alphanumeric graphic form under note is digital-signal-ized, input actuation is carried out directly at a computer, or computer operation can be made simply and exact, and the aforementioned technical problem is solved.

[0005]

[Function] If it is written down or operated with the ball-point for computer operation or mouse of this invention, since non-magnetic material and a magnetic polar granule are made intermingled, to a microsphere, a magnetic change will be digitized as an electrical signal with the 1st magnetism conversion means and the 2nd magnetism conversion means in the rolling motion of the microsphere,

the signal will be calculated as X shaft-orientations Y shaft-orientations movement magnitude to it, and a locus will be signal-ized by this.

[0006]

[Example] Hereafter, the example of this invention is explained based on a drawing. First, the 1st example of this invention is mainly concerned with the globular form measurement sensor for the ball-points for computer operation, as shown in drawing 1 thru/or drawing 10. Drawing 1 is the important section of the 1st example of this invention, and is the expanded part. A microsphere 1 is combined or mixed in the magnetic polar granules 3, such as an iron system member, in quality of the material based on the non-magnetic material 2, such as brass, and the diameters of the microsphere 1 are about 1mm thru/or about 4mm.

[0007] If this microsphere 1 is manufactured, many frames 1a and 1a and -- are divided into abbreviation equivalent area on the front face of this microsphere 1, and much electromagnetic identification marking m and m which becomes these frames 1a and 1a and the proper location of --, for example, a mid gear, 1a, the lap section between 1a, etc. magnetic polar granule 3, and -- are prepared. Since the frame 1a is the datum level of electromagnetic identification marking m to the last, after it forms electromagnetic identification marking m, it becomes unnecessary. Moreover, each electromagnetic identification marking m makes \*\*\*\*\* , and is maintaining regular intervals.

[0008] The microsphere 1 which consists of non-magnetic material 2 and a magnetic polar granule 3 is manufactured according to two kinds of manufacturing methods, as shown in drawing 5 and drawing 6. first, the thing which becomes as a mixed sintering object in the example of drawing 5 -- it is -- the particle of an iron system member with a diameter of about 0.3mm -- a ball -- [refer to drawing 5 (A)].

[ by which the whole is covered with about 0.05mm brass coat 2a in the magnetic polar granule 3 ] thus, the fabricated particle with brass coat 2a -- a ball -- while about 80 order of the magnetic polar granule 3 is sintered at proper temperature -- abbreviation -- it fastens spherically and hardens -- having -- brass -- the particle of non-magnetic material 2 and a large number -- a ball -- the magnetic polar granules 3 and 3 and the microsphere 1 which consists of -- as a mixed sintering object -- abbreviation -- [refer to drawing 5 (B)]. [ which is constituted so that a spherical diameter may be set to about 2.5mm thru/or about 3mm ] only a front face carries out polish processing as about 2mm ball from such a condition -- having -- the particle of a spherical-surface part -- a ball -- [ drawing 5 (C) and refer to the (D)]. [ which will be in the condition that the proper part of the magnetic polar granule 3 was exposed ] The cross-section part of this magnetic polar granule 3 that it was ground and was exposed is constituted as said electromagnetic identification marking m, and the adjoining electromagnetic identification marking m and m is formed in the suitably distant location [refer to drawing 5 (C)]. such mixed sintering -- an object -- a corpuscle can be manufactured comparatively simply and cheaply.

[0009] moreover, the thing which becomes as a mixed connective in the example of drawing 6 -- it is -- the diameter of about 1.6mm -- a ball -- brass -- nonmagnetic core object 2b is prepared. and the particle of an iron system member with a diameter of about 0.3mm -- a ball -- the particle with brass coat 2a which the whole was covered with about 0.05mm brass coat 2a, and the magnetic polar granule 3 fabricated in this way -- a ball -- [refer to drawing 6 (A)]. [ the magnetic polar granule 3 is arranged and sintered by whose perimeter side of the ball of said nonmagnetic core object 2b ] as about 2mm ball which serves as a minor diameter from this after this sintering -- a particle with [ of a front face ] brass coat 2a -- a ball -- polish processing is carried out in the semi-sphere location of the magnetic polar granule 3 -- having -- the particle of a spherical-surface part -- a ball -- [ drawing 6 (B) and refer to (C)]. [ which will be in the condition that the proper part of the magnetic polar granule 3 was cut ] The cross-section part of the magnetic polar granule 3 which it was ground and was exposed is constituted as said electromagnetic identification marking m, and the adjoining electromagnetic identification marking m and m is formed in the suitably distant location. the case of this mixed connective -- a particle -- a ball -- it is cut in the diameter part of the magnetic polar granule 3 -- \*\*\*\*\* -- electromagnetic identification marking m -- abbreviation -- the same thing is obtained, and though it is a microsphere, it has much electromagnetic discernment, there is an average degree of hardness, and it can do with high precision.

[0010] As for Holder A, the spherical-surface-like crevice 4 where said microsphere 1 is inserted is formed at nothing and the near puckered tip of it in the cone mold. This spherical-surface-like crevice 4 is a hole which can insert about [ of said microsphere 1 ] about  $2/3$ , and it is inserted and it is constituted without carrying out caulking fixing so that the tip part of the spherical-surface-like crevice 4 may be shut after inserting a microsphere 1 in the spherical-surface-like crevice 4 loosely, and a microsphere's 1 jumping out of the spherical-surface-like crevice 4. By this, a microsphere 1 rolls in the direction of arbitration to the spherical-surface-like crevice 4.

[0011] If a microsphere 1 is loosely inserted in the spherical-surface-like crevice 4 of said holder A and it sees as the cross section on the basis of the core of this microsphere 1, on the cross section, the 1st magnetism conversion means 5 and the 2nd magnetism conversion means 6 of changing change of the amount of magnetic flux into an electrical signal are mutually formed in the right-angle location. As shown in drawing 3, specifically said 1st magnetism conversion means 5 and the 2nd magnetism conversion means 6 The upper part of the iron core sections 5a and 6a used as an abbreviation inverse triangle is rolled with sensing or the coils 5b and 6b for excitation. Electromagnetic identification marking m of said microsphere 1 is identified in the both-sides tip part of the iron core sections 5a and 6a, when [ this ] it identifies, the magnetic-flux circuit of those iron core sections 5a and 6a serves as a letter of closing, the amount of magnetic flux increases and electromotive force changes in proportion to this increment. This change is changed as an electrical signal with the 1st magnetism conversion means 5 and the 2nd magnetism conversion means 6.

[0012] As shown in the mid gear of said holder A at drawing 1, the ink feeder B is formed. this ink feeder B -- a collar -- it consists of a hollow pipe 7 with 7a, and a coil spring 8, and said hollow pipe 7 is inserted in the traverse hole 9 with stage 9a prepared in the mid gear of said holder A, and it fills up with oily ink in this hollow pipe 7. the collar of the hollow pipe 7 -- said coil spring 8 intervenes between 7a and stage 9a, and it is lightly stuck to extent to which the oily ink film does not go out in the resiliency of this coil spring 8 by pressure. If a microsphere 1 rolls by note, it will adhere and move to a microsphere 1, oily ink will be imprinted by longhand, and a writing activity will complete it.

[0013] As shown in drawing 7, said holder A is connected with the penholder body 10 of the ball-point for computer operation, and the switch SW of operation is formed in the middle of this penholder body 10, Wire W is formed in this back end, and it is constituted possible [ connection with the body 20 of a computer ]. In this wire W, wiring by the side of I/O of sensing of said 1st magnetism conversion means 5 and the 2nd magnetism conversion means 6 or the coils 5b and 6b for excitation is inserted in.

[0014] In arithmetic and program control (CPU) 11, it has 11d of Y-axis movement magnitude control means which change X-axis pulse reading means 11a, such as a counter, Y-axis pulse reading means 11b, X-axis movement magnitude control means 11c that changes this read X-axis pulse number into distance, and a Y-axis pulse number into distance, identifying electromagnetic identification marking m which said microsphere 1 becomes magnetic polar granule 3 electromagnetic, and amplifying it.

[0015] It is RAM which the X-axis pulse number or Y-axis pulse number read, respectively in X-axis pulse reading means 11a of arithmetic and program control (CPU) 11 and Y-axis pulse reading means 11b was memorized by the X-axis pulse number storage means 12 and the Y-axis pulse number storage means 13 as data, was stored in them, respectively, and was suitably constituted by the command of arithmetic and program control 11 possible [ read-out ].

[0016] Moreover, it becomes irregular, and it gets over again for the display means 14, such as a screen of CRT of the body of a computer etc., and both the data of the X-axis movement magnitude and Y-axis movement magnitude are constituted so that "the the very thing character representation which wrote with the pen, "2", and "3", or "A" may be displayed. [ for example, ] With the pen, the note as a usual pen is made to coincidence in oily ink.

[0017] Next, if an operation is based and explained in the flow chart Fig. shown in drawing 10, first, it will switch on, and will start and actuation initiation of the ball-point for computer operation will be carried out (S1 reference). Then, while a microsphere 1 rolls according to actuation by friction and an alphabetic character can be written down on space etc. by the actuation, an X-axis pulse number and a Y-axis pulse number are read into the rolling motion and coincidence of the microsphere 1 in X-axis

pulse reading means 11a of arithmetic and program control (CPU) 11, and Y-axis pulse reading means 11b (S2 reference). And this X-axis pulse number and a Y-axis pulse number are memorized (S3 reference). The X-axis pulse number and Y-axis pulse number which were stored are read, and X-axis movement magnitude and Y-axis movement magnitude are calculated in X-axis movement magnitude control means 11c of arithmetic and program control (CPU) 11, and 11d of Y-axis movement magnitude control means (refer to S4), this output signal is modulated and it transmits to the body 20 of a computer (S5 reference), and digital display of this is carried out to the display means 14 as X-axis movement magnitude and Y-axis movement magnitude, and it ends (S6 reference).

[0018] Next, when the 2nd example of this invention is explained, as shown in drawing 11, it is a globular form measurement sensor for the mice for computer operation. The ink feeder [ in / in this / the globular form measurement sensor of said ball-point for computer operation ] B does not exist, but the other configurations 1, i.e., a microsphere, non-magnetic material 2, the magnetic polar granule 3, electromagnetic identification marking m, Holder A, the spherical-surface-like crevice 4, other electric means, etc. are the same as that of the configuration of the globular form measurement sensor of said ball-point for computer operation, and omit explanation. Furthermore, the same is said of an operation.

[0019]

[Effect of the Invention] Non-magnetic material 2 and the magnetic polar granule 3 are made intermingled near the front face of a corpuscle or this corpuscle in invention of claim 1. It considers as many magnetic polar granules 3 of the front face, and the microsphere 1 whose electromagnetic discernment carried out the abbreviation regular intervals of between three, and was enabled. This microsphere 1 is inserted possible [ rolling in all directions ] in Holder A. By having considered as the ball-point for computer operation or the globular form measurement sensor for mice which comes to build a 1st magnetism conversion means 5 to measure the X-axis rolling direction and the Y-axis rolling direction, respectively, and to change said non-magnetic material 2 and magnetic polar granule 3 into an electrical signal electromagnetic, and the 2nd magnetism conversion means 6 Since the trackball itself set to the 1st microsphere 1 is an element of a sensor, a sensing roller is made unnecessary, -izing of a ball-point or the mouse can be carried out [ small lightweight ] extremely, change of magnetism is changed [ 2nd ] into an electrical signal, and the effectiveness of being able to use as a good sensor is done so.

[0020] Since it considered as the microsphere 1 which enabled intermingled electromagnetic discernment from non-magnetic material 2 and the magnetic polar granule 3 of near the front face of a corpuscle or this corpuscle when this effectiveness was explained in full detail, it is discriminable to abbreviation accuracy with the number which identified the movement magnitude by the rolling motion of a microsphere 1 with the 1st magnetism conversion means 5 and the 2nd magnetism conversion means 6 of measuring the X-axis rolling direction and the Y-axis rolling direction electromagnetic, respectively.

[0021] As mentioned above, by this invention, since the conventional sensing roller was made unnecessary, it can miniaturize and can input to a computer as digital data at coincidence.

[0022]

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CLAIMS

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[Claim(s)]

[Claim 1] It considers as the microsphere whose electromagnetic discernment made non-magnetic material and a magnetic polar granule intermingled near the front face of a corpuscle or this corpuscle, made between the magnetic polar granules of a majority of the front face abbreviation regular intervals, and was enabled. A 1st magnetism conversion means to insert this microsphere possible [ rolling in all directions ] in a holder, and to measure the X-axis rolling direction and the Y-axis rolling direction for said non-magnetic material and magnetic polar granule electromagnetic, respectively, The ball-point for computer operation or the globular form measurement sensor for mice characterized by coming to build the 2nd magnetism conversion means.

[Claim 2] The ball-point for computer operation or the globular form measurement sensor for mice characterized by becoming in claim 1 as a microsphere which becomes considering non-magnetic material and a magnetic polar granule as a mixed sintering object.

[Claim 3] The ball-point for computer operation characterized by coming to prepare the ink feeder which supplies ink to said microsphere in a holder in claim 1.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The important section sectional view of the globular form measurement sensor for the ball-points for computer operation of this invention

[Drawing 2] The P-P view of drawing 1 is the sectional view made into the flat surface a part.

[Drawing 3] The perspective view of the primary member of this invention

[Drawing 4] A microsphere is an enlarged drawing a part.

[Drawing 5] (A), (B), (C), and (D) are the whole which shows the process which manufactures a microsphere as a mixed sintering object, or some sectional views.

[Drawing 6] (A), (B), and (C) are the whole which shows the process which manufactures a microsphere as a mixed connective, or some sectional views.

[Drawing 7] The external view of the ball-point for computer operation, or the mouse for computer operation

[Drawing 8] The system chart of the ball-point for computer operation, or the mouse for computer operation

[Drawing 9] The block diagram of the ball-point for computer operation, or the mouse for computer operation

[Drawing 10] The ball-point for computer operation, or the flow chart Fig. of the mouse for computer operation

[Drawing 11] The important section sectional view of the globular form measurement sensor for the mice for computer operation of this invention

[Description of Notations]

A -- Holder

1 -- Microsphere

2 -- Non-magnetic material

3 -- Magnetic polar granule

5 -- The 1st magnetism conversion means

6 -- The 2nd magnetism conversion means

B -- Ink feeder

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[Translation done.]



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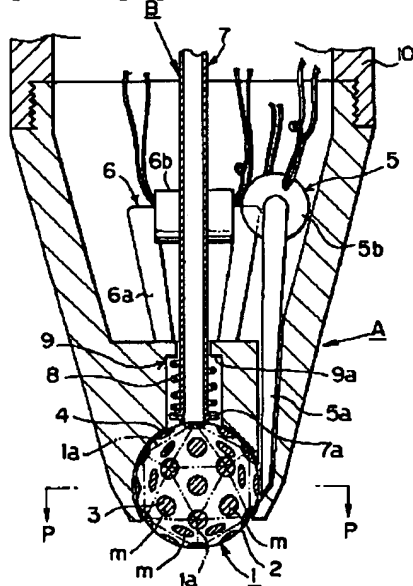
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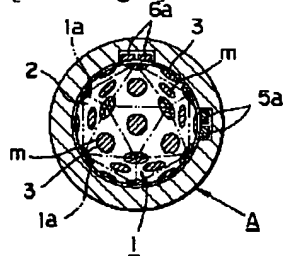
DRAWINGS

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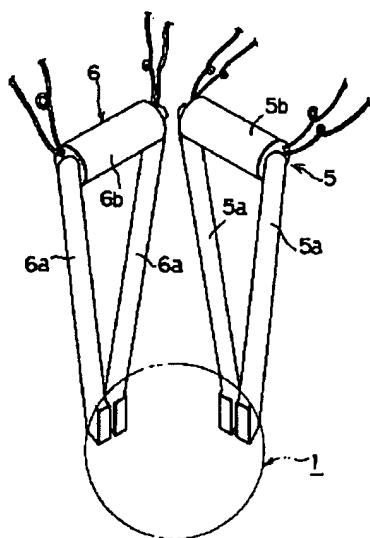
[Drawing 1]



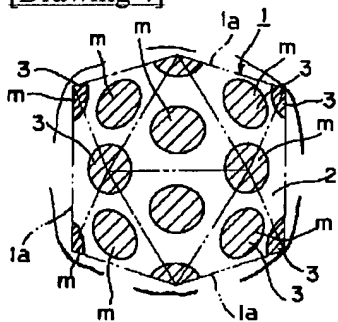
[Drawing 2]



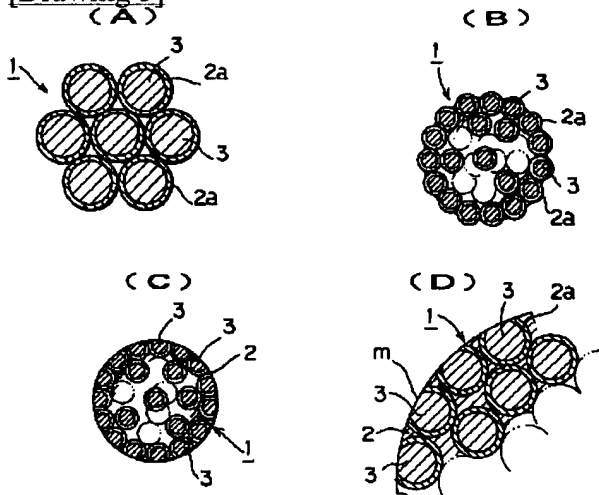
[Drawing 3]



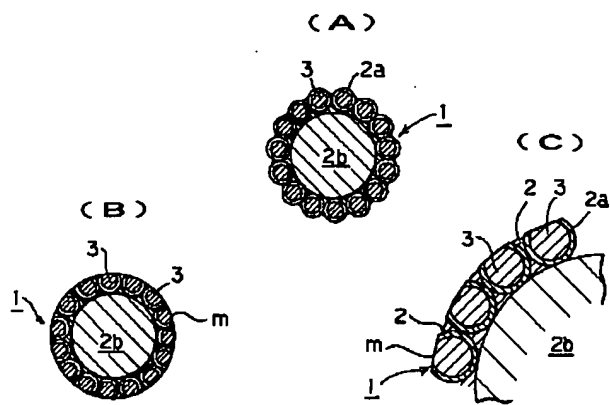
[Drawing 4]



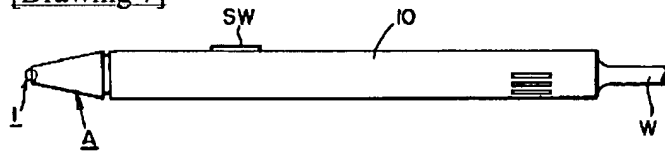
[Drawing 5]



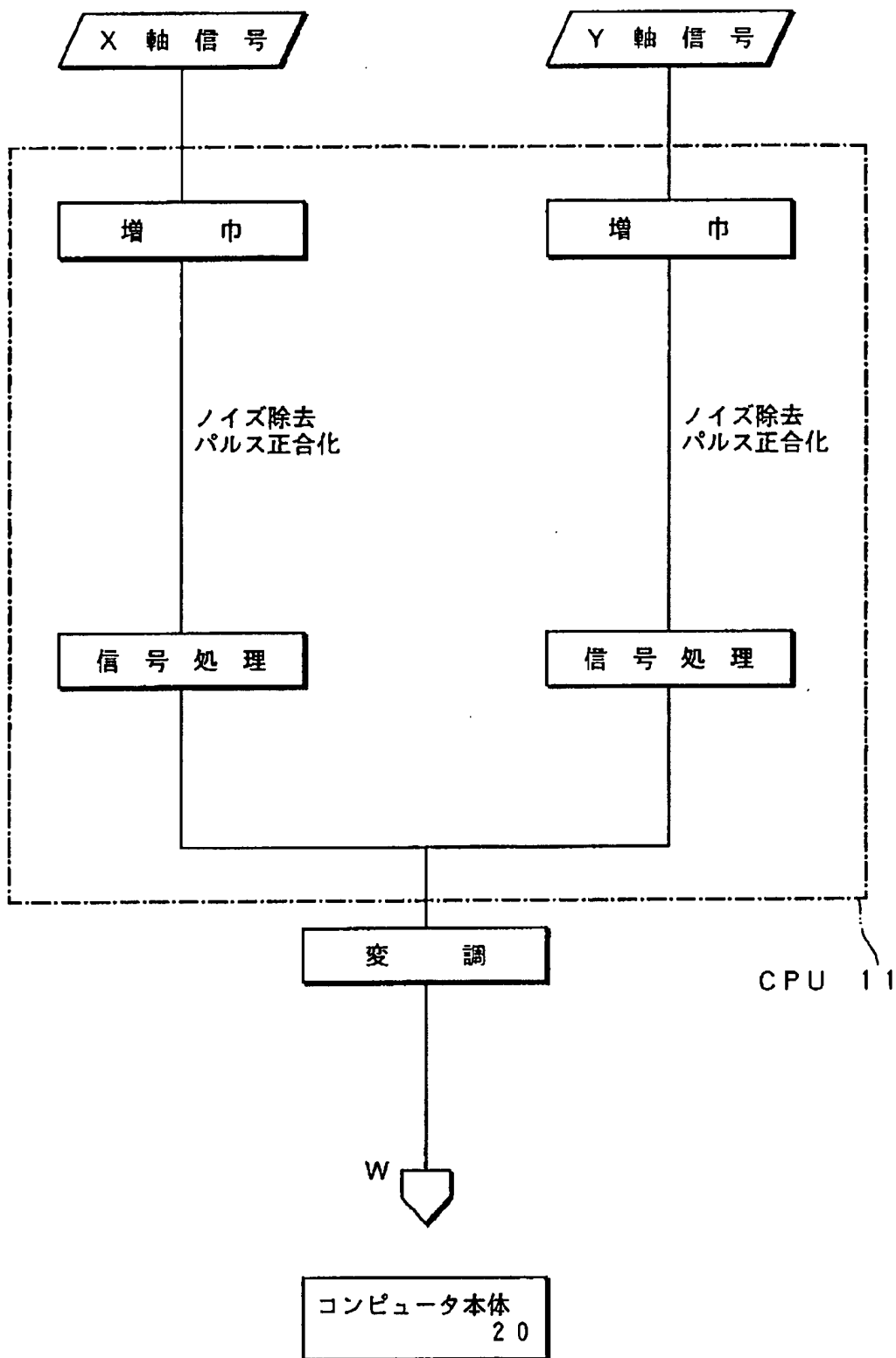
[Drawing 6]



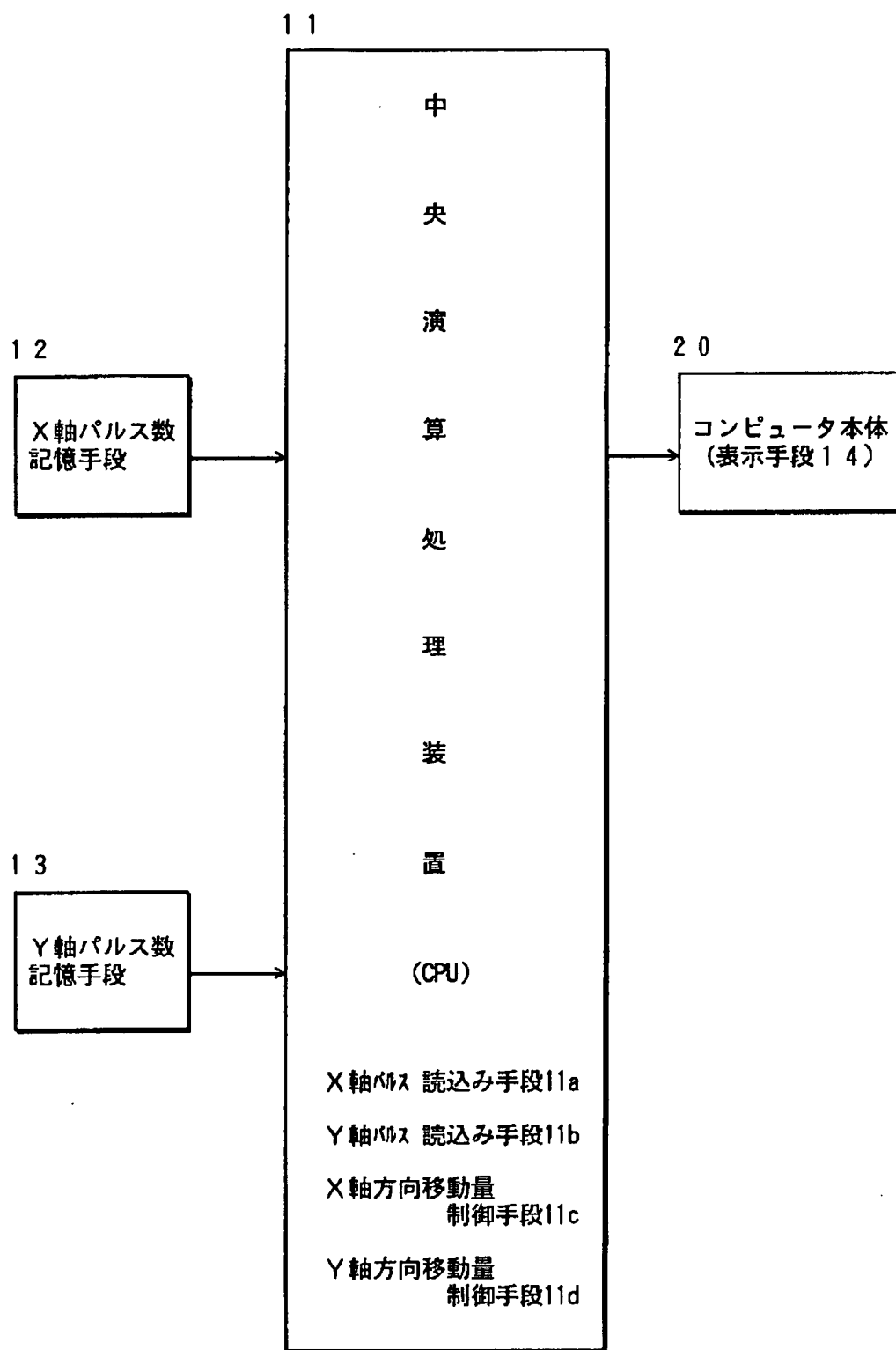
[Drawing 7]



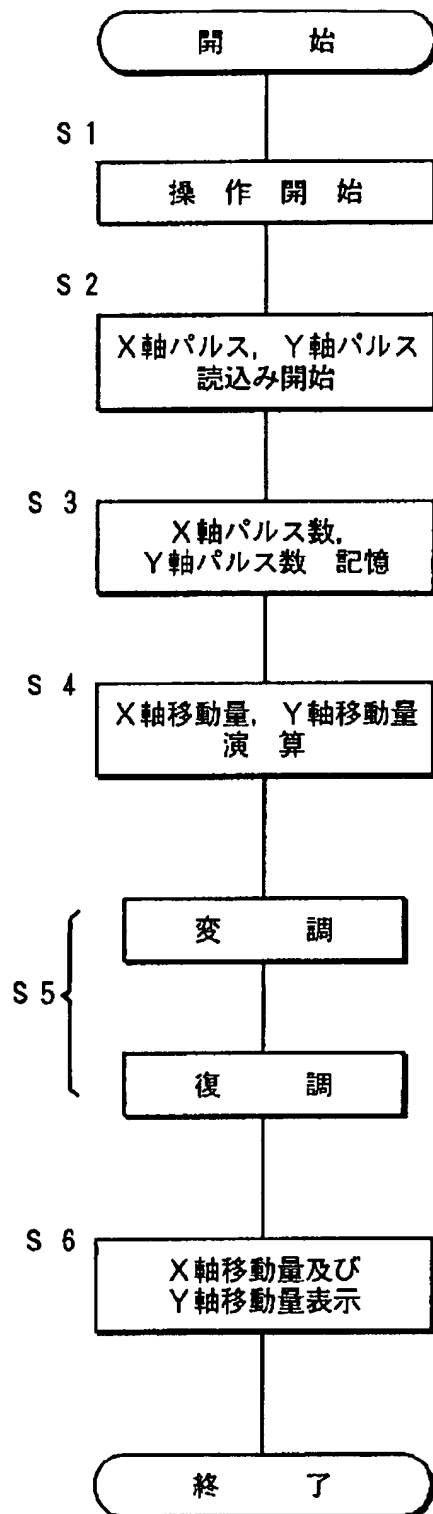
[Drawing 8]



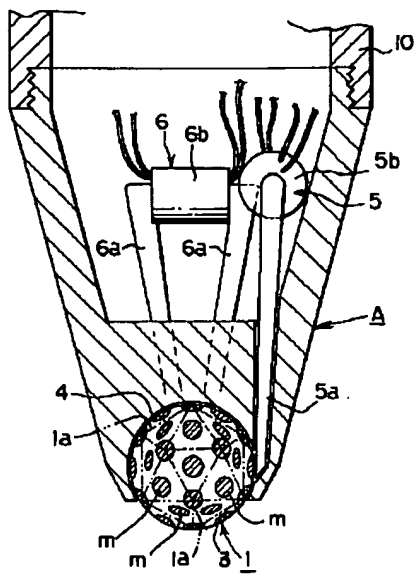
[Drawing 9]



[Drawing 10]



[Drawing 11]



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[Translation done.]